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<b>INFORMATION DISCLOSURE CITATION IN AN APPLICATION</b>  (PTO-1449)				ATTY. DOCKET NO. <b>43888-067</b>		SERIAL NO. <b>09/406,832</b>	
				APPLICANT <b>Keiko YUGAWA, et al.</b>			
				FILING DATE <b>September 28, 1999</b>		GROUP <b>1743</b>	
<b>U.S. PATENT DOCUMENTS</b>							
EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE	
<b>FOREIGN PATENT DOCUMENTS</b>							
EXAMINER'S INITIALS	PATENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	Translation	
						Yes	No
<b>OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)</b>							
<i>an</i>	Hiromi Yoshida and Koji Sode, Thr424 to Asn Substitution Alters Bivalent Metal Specificity of Pyrroloquinoline Quinone Glucose Dehydrogenase, 1997, J. Biochem. Mol. Biol. & Biophys., Vol. 1, pp. 89-93 <i>F</i>						
<i>an</i>	Arief Budi Witarto, Shokichi Oh-Uchi, Mitsuaki Narita, and Koji Sode, Secondary Structure Study of Pyrroloquinoline Quinone Glucose Dehydrogenase, 1999, J. Biochem. Mol. Biol. & Biophys., Vol. 1, pp. 209-213 <i>F</i>						
<i>an</i>	Koji Sode and Hiroyuki Sano, Glu742 Substitution To Lys Enhances The EDTA Tolerance of Escherichia Coli PQQ Glucose Dehydrogenase, 1994, Biotechnology Letters, Vol. 16, No. 5, pp. 455-460 <i>May</i>						
<i>an</i>	Arief Budi Witarto, Takafumi Ohtera, and Koji Sode, Site-Directed Mutagenesis Study on the Thermal Stability of a Chimeric PQQ Glucose Dehydrogenase and Its Structural Interpretation, 1999, Applied Biochemistry and Biotechnology, Vol. 77-79, pp. 159-168						
<i>an</i>	Marcel Dekker, Inc., Oxygen Insensitive Glucose Biosensor Based on PQQ-Dependent Glucose Dehydrogenase, 1999, Analytical Letters, Vol. 32(2), pp. 299-316 <i>F</i>						
<i>an</i>	Kazunobu Matsushita, Hirohide Toyama, Minoru Ameyama, Osao Adachi, Aster Dewanti, and Johann A. Duine, 1995, Biosci. Biotech. Biochem, Vol. 59(8), pp. 1548-1555 <i>F</i>						

*F made entries*

**OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)**

CM	Kazunobu Matsushita, Yasue Ohno, Emido Shinagawa, Osao Adachi, and Minoru Ameyama, 1980, Agric. Biol. Chem, Vol. 44(7), pp. 1505-1512 ¶
CM	Minoru Ameyama, Masatsugu Nonobe, Emiko Shinagawa, Kazunobu Matsushita, Koichi Takimoto, and Osao Adachi, 1986, Agric. Biol. Chem., Vol. 50(1), pp. 49-57 ¶
CM	Minoru Ameyana, Emiko Shinagawa, Kazunobu Matsushita, and Osao Adachi, D-Glucose Dehydrogenase of Gluconobacter suboxydans: Soubilization, Purification and Characterization, 1981, Agric. Biol. Chem., Vol. 45(4), pp. 851-861 ¶
CM	Jens G. Hauge, Glucose Dehydrogenase of Bacterium anitratum: an Enzyme with a Novel Prosthetic Group, 1964, Vol. 239, No. 11, pp. 3630-3639 ¶
	Koji sode, Satoshi Nakasono, Mitsuharu Tanaka, and Tadashi Matsunaga, Subzero Temperature Operating Biosensor Utilizing an Organic Solvent and Quinoprotein Glucose Dehydrogenase, 1993, Biotechnology and Bioengineering, Vol. 42, pp. 251-254
CM	Tokuji Ikeda, Hiroshige Matsubara, Kan Kato, Dyah Iswantini, Kenji Kano, Mamoru Yamada, Electrochemical Monitoring of In Vivo Reconstitution of Glucose Dehydrogenase in Escherichia Coli Cells With Externally Added Pyrroloquinoline Quinone, 1998, Journal of Electroanalytical Chemistry, Vol. 449, pp. 219-224 ¶
A	E.J. D'Costa, I.J. Higgins and A.P.F. Turner, Quinoprotein Glucose Dehydrogenase and its Application in an Amperometric Glucose Sensor, 1986, Biosensors, Vol. 2, pp. 71-87 ¶
	Asteriani R. Dewanti and Johannis A. Duine, $Ca^{2+}$ -Assisted, Direct Hydride Transfer, and Rate-Determining Tautomerization of C5-Reduced PQQ to PQQH <sub>2</sub> , in the Oxidation of $\beta$ -D-Glucose by Soluble, Quinoprotein Glucose Dehydrogenase, 2000, Biochemistry 2000, Vol. 39, pp. 9384-9392
CM	Koji Sode and Hiromi Yoshida, Construction and Characterization of a Chimeric Escherichia Coli PQQ Glucose Dehydrogenase (PQQGHD) with Increased EDTA Tolerance, 1997, Denki Kagaku, Vol. 65, No. 6, pp. 441-451
CM	Tomohiko Yamazaki, Wakako Tsugawa, and Koji Sode, Increased Thermal Stability of Glucose Dehydrogenase by Cross-Linking Chemical Modification, 1999, Biotechnology Letters, Vol. 21, pp. 199-202 ¶
CM	Koji Sode, Miki Shirahane, and Hiromi Yoshida, Construction and Characterization of A Linked-Dimeric Pyrroloquinoline Quinone Glucose Dehydrogenase, 1999, Biotechnology Letters, Vol. 21, pp. 707-710 ¶

**OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)**

CM	Koji Sode, Tomonori Shimakita, Shokichi Ohuchi, and Tomohiko Yamazaki, Stabilization of Pyrroloquinoline Quinone Glucose Dehydrogenase By Cross-Linking Chemical Modification, 1996, Biotechnology Letters, Vol. 18, No. 9, pp. 997-1002
CM	Koji Sode and Nozomu Yasutake, Preparation of Lyophilized Pyrroloquinoline Quinone Glucose Dehydrogenase Using Trehalose As An Additive, 1997, Biotechnology Techniques, Vol. 11, No. 8, pp. 577-580 ¶
CM	Koji Sode, Arief Budi Witarto, Kazumoto Watanabe, Keisuke Noda, Shunsuke Ito and, Wakako Tsugawa, Over Expression of PQQ Glucose Dehydrogenase in Escherichia Coli Under Holo Enzyme Forming Condition, 1994, Vol. 16, No. 12 , pp. 1265-1268 Dec.
CM	Koji Sode, Hiromi Yoshida, Kazunori Matsumura, Tomoko Kikuchi, Mika Watanabe, Nozomo Yasutake, Shunsuke ITO and Hiroyuki Sano, Elucidation of The Region Responsible For Edta Tolerance In PQQ Glucose Dehydrogenases By Construction Escherichia Coli and Acinetobacter Calcoaceticus Chimeric Enzymes, 1995, Biochemical and Biophysical Research Communications, Vol. 211, No. 1, pp. 268-273 Jan.
CM	Koji Sode, Wakako Tsugawa, Tomohiko Yamazaki, Masato Watanabe, Nobuhiro Ogasawara, and Mitsuharu Tanaka, A Novel Thermostable Glucose Dehydrogenase Varying Temperature Properties By Altering Its Quaternary Structures, 1996, Enzyme and Microbial Technology, Vol. 19, pp. 82-85 ¶
CM	Koji Sode, Kazumoto Watanabe, Shunsuke Ito, Kazunori Matsumura, Tomoko Kikuchi, Thermostable Chimeric PQQ Glucose Dehydrogenase, 1995, Federation of European Biochemical Societies Letters, Vol. 364, pp. 325-327 ¶
CM	Koji Sode, Koji Ito, Arief Budi Witarto, Kazumoto Watanabe, Hiromi Yoshida, Pieter Postma, Increased Production of Recombinant Pyrroloquinoline Quinone (PQQ) Glucose Dehydrogenase By Metabolically Engineered Escherichia Coli Strain Capable of PQQ Biosynthesis, 1996, Journal of Biotechnology, pp. 239-243 ¶
CM	Koji Sode, Sayaka Sugimoto, Mika Watanabe, Wakako Tsugawa, Effect of PQQ Glucose Dehydrogenase Overexpression In Escherichia Coli On Sugar-Dependent Respiration, 1995, Journal of Biotechnology, Vol. 43, pp. 41-44 ¶
CM	Arjen J.J. Olsthoorn, Tetsuo Otsuki and Johannis A. Duine, Negative Cooperativity In The Steady-State Kinetics of Sugar Oxidation By Soluble Quinoprotein Glucose Dehydrogenase From Acinetobacter Calcoaceticus, 1998, Eur. J. Biochem, pp. 255-261 ¶

09/4/06/832

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)	
✓	Ling Ye, Martin Hammerle, Arjen J.J. Olsthoorn, Wolfgang Schuhmann, Hans-Ludwig Schmidt, Johannis A. Duine, and Adam Heller, High Current Density "Wired" Quinoprotein Glucose Dehydrogenase Electrode, 1993, Analytical Chemistry, Vol. 65, No. 3, pp. 238-241
✓	Hiromi Yoshida, Katsuhiro Kojima, Arief Budi Witarto and Koji Sode, Engineering a Chimeric Pyrroloquinoline Quinone Glucose Dehydrogenase: improvement of EDTA tolerance, thermal stability and substrate specificity, 1999, Protein Engineering, Vol. 12, No. 1, pp. 63-70
✓	K. Sode and K. Kojima, Improved Substrate Specificity and Dynamic Range For Glucose Measurement of Escherichia Coli PQQ Glucose Dehydrogenase By Site Directed Mutagenesis, 1997, Biotechnology Letters, Vol. 19, No. 11, pp. 1073-1077
✓	Tomohiko Yamazaki, Wakako Tsugawa, and Koji Sode, Subunit Analyses of a Novel Thermostable Glucose Dehydrogenase Showing Different Temperature Properties According to Its Quaternary Structure, Applied Biochemistry and Biotechnology, Vol. 77-79, pp. 325-335
✓	Paul Dokter, John E. Van Wielink, Mario A.G. Van Kleef and Johannis A. Duine, Cytochrome b-562 from Acinetobacter Calcoaceticus L.M.D. 79.41, 1988, Biochem J., Vol. 254, pp. 131-138
✓	Koji Sode, Kazunori Matsumura, Wakako Tsugawa, and Mitsuharu Tanaka, Isolation of a Marine Bacterial Pyrroloquinoline Quinone-Dependent Glucose Dehydrogenase, 1995, J. Mar. Biotechnol, Vol. 2, pp. 214-218
✓	A. Geerlof, P. Dokter, J.E. van Wielink and J.A. Duine, Haem-Containing Protein Complexes of Acinetobacter Calcoaceticus As Secondary Electron Acceptors for Quinoprotein Glucose Dehydrogenase, 1989, Antonie van Leeuwenhoek, Vol. 56, pp. 81-84
✓	Wen Jin, Ulla Wollenberger and Frieder W. Scheller, PQQ as Redox Shuttle for Quinoprotein Glucose Dehydrogenase, 1998, Biol. Chem., Vol. 379, pp. 1207-1211
✓	Jens G. Hauge, Kinetics and Specificity of Glucose Dehydrogenase From Bacterium Anitratum, 1960, Biochim. biophys. Acta, Vol. 45, pp. 263-269.
✓	Arthur Oubrie, Henriette J. Rozeboom, Kor H. Kalk, Johannis A. Duine and Bauke W. Dijkstra, The 1.7 Å Crystal Structure of the Apo Form of the Soluble Quinoprotein Glucose Dehydrogenase from Acinetobacter calcoacetus Reveals a Novel Internal Conserve Sequence Repeat, 1999, Vol. 289, pp. 319-333
✓	Jens G. Hauge, Purification and Properties of Glucose Dehydrogenase and Cytochrome b from Bacterium Anitratum, 1960, Biochim. Biophys. Acta, Vol. 45, pp. 250-262

09/4/06 832

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)	
CM	Matthias Wanner, Torsten Sixt, Karl-Wilhelm Klinkhammer, and Wolfgang Kaim, First Experimental Structure of a 1:1 Metal Complex with a PPQ Cofactor Derivative Ouside Dehydrogenase Enzymes, 1999, Inorganic Chemistry, Vol. 38, No. 11, pp. 2753-2755 $\checkmark$
CM	Asteriani R. Dewanti and Johannis A. Duine, Reconstitution of Membrane -Integrated Quinoprotein Glucose Dehydrogenase Apoenzyme with PQQ and the Holoenzyme's Mechanism of Action, 1998, Biochemistry, Vol. 37, No. 19, pp. 6810-6818 $\checkmark$
CM	M. Alkasrawi, I.C. Popescu, V. Laurinavicius, B. Mattiasson and E. Csoregi, A Redox Hydrogel Integrated PQQ-Glucose Dehydrogenase Based Glucose Electrode, 1999, Anal. Communication, Vol. 36, pp. 395-398 $\checkmark$
CM	Juan-R. Mor and Rocco Guarnaccia, Assay of Glucose Using an Electrochemical Enzymatic Sensor, 1977, Analytical Biochemistry, Vol. 79, pp. 319-328 $\checkmark$
CM	J.A. Duine, J. Frank and J.K. Van Zeeland, Glucose Dehydrogenase From Acinetobacter Calcoaceticus, FEBS Letters, 1979, Vol. 108, No. 2, pp. 443-446 $\checkmark$
CM	Dyah Iswantini, Kan Kato, Kenji Kano, Tokuji Ikeda, Electrochemical Measurements of Glucose Dehydrogenase Activity Exhibited By Escherichia Coli Cells; Effects of the Additions of Pyrroloquinoline Quinone, Magnesium or Calcium Ions and Ethylenediaminetetraacetic Acid, 1998, Bioelectrochemistry and Bioenergetics, Vol. 46, pp. 249-254 $\checkmark$
CM	Kazunobu Matsushita, Emiko Shinagawa, Osao Adachi and Minoru Ameyama, Quinoprotein D-glucose Dehydrogenases in Acinetobacter Calcoaceticus LMD 79:41: Purification and Characterization of the Membrane-Bound Enzyme Distinct from the Soluble Enzyme, 1989, Antonie van Leeuwenhoek, Vol. 56, pp. 63-72 $\checkmark$
CM	Gyles E. Cozier and Christopher Anthony, Structure of the Quinoprotein Glucose Dehydrogenase of Escherichia Coli Modelled on that of Methanol Dehydrogenase from Methylobacterium Exorquens, 1995, Biochem. J., Vol. 312, pp. 679-685 $\checkmark$
EXAMINER <i>Ch. Koggerala</i> DATE CONSIDERED <i>10/34/01</i>	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.